

**TREATISE on the MONSOONS**

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**E A S T - I N D I A .**

TREATISE on the MONSOONS

EAST-INDIA.

A 7 C C 6

T R E A T I S E  
ON THE  
M O N S O O N S  
IN  
E A S T - I N D I A .

BY CAPT. THOMAS FORREST.

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НЕМ. БОНД-СТАРТ

MDCCCLXXII.

TO  
**LAWRENCE SULLIVAN, ESQ.**

**CHAIRMAN OF THE COURT OF DIRECTORS  
OF THE HON. EAST-INDIA COMPANY,**

THIS  
**TREATISE ON THE MONSOONS**

IS INSCRIBED,  
BY  
**HIS OBLIGED, AND  
MOST OBEDIENT  
HUMBLE SERVANT,**

**T. FORREST.**

**CALCUTTA,  
MARCH 1782.**

C. T.

LAURENCE SULLIVAN

CHARMAN OF THE COURT OF DIRECTORS

OF THE EAST-INDIA COMPANY

THIS

TREATISE ON THE MONGOLS

IS INCORRECT

BY

HSI OBIGEE, AND

MONT GOMERIE,

HUMBLE SURRENT,

L. FORRESTER

AT LONDON

1781. MDCCLXXXI.

## CONTENTS.

Introduction. Page xii

### C H A P. I.

Of the Monsoons in general. i

### C H A P. II.

Of the Causes of the Monsoons in India; their Analogy to what we find in the Atlantic; and how they coincide with or oppose the Trade-winds. 5

A 4 C H A P.

[ viii ]

C H A P. III.

*Of the Middle Cross Winter Mon-  
soon.*

15

C H A P. IV.

*Of the Cross Summer Monsoon.* 25

C H A P. V.

*Of the most eligible Track to keep  
from Europe to East-India.* 29

C H A P. VI.

*Of the Monsoons on the South-west  
Coast of the Island Sumatra.* 41

C H A P.

C H A P. VII.

*Of the proper Track to keep in going  
from Madras or Bengal, to Ben-  
coolen, Batavia, or Parts further  
East, during the Winter North-east  
Monsoon.*

53

C H A P. VIII.

*Of the best Track to keep from Ma-  
dras, or Bengal, to Bencoolen, during  
the South-west Monsoon.*

57

C H A P. IX.

*Of the best Track to keep from In-  
dostan to Celebes, or the Moluccas,  
during the South-west Monsoon.*

67

A 5 C H A P.

[ x ]

APR 15 1840 CHAP

C H A P. X.

Of sailing from Indostan to Magindano, (or Mindano) at all Times of the Year. 71

C H A P. XI.

Of the Outer Passage to Bombay; of cross Winds in the Bay of Bengal; Currents in the China Seas; South Coast of Africa; Passage Home.

77

APR 15 1840 CHAP

C H A P. XII.

Description of the Island of Trinidado.

87

Conclusion.

93

INTRO-

## INTRODUCTION.

**N**Otwithstanding the remarks, rules, and observations, already published concerning the navigation from Europe, to and from India, also in India, which are to be found in the Old East-India Pilot, by Thornton; in D'Anville's Neptune Oriental; also, in Mr. Nicholson's and Philo Nauticus's judicious remarks; it were to be

A 6              wished

wished we had more observations upon the subject. It is only from experience such observations can be made.—Above twenty years practice in what is called the country trade in India, during which time I made no less than fifteen voyages from Indostan to the eastward, enabling me to say a good deal upon the subject, is the reason of the present publication.

I find many good rules and observations in each of the authors already mentioned. The India Pilot errs in some things, though

though he is right in others. Philo Nauticus I had the pleasure of knowing personally in India: he was a good merchant, and a skilful navigator. I shall, with great deference to him, and Mr. Nicholson, repeat a good deal of what they say, and add illustrations of my own. I shall also retain what I find in the India Pilot, when it is consonant to my own observation, and do him all the justice I can. His rules for sailing to and from Batavia, are in the main good; but his description of Bencoolen, and the

south-

south-west coast of Sumatra, is unintelligible. And here I must observe, that, as I know little of the Persian and Red-sea gulfs in the west of India, never having been there, I cannot criticise on his account of them, nor of the parts adjacent ; as my experience has been mostly east of Ceylon. His rules for sailing along the coast of Coromandel and Ceylon, from accidents, such as the cutting down of trees, pulling down pagodas, building of new ones, &c. local changes, must make his land-marks of little use at present;

present; but, when wrote, I dare say they were good.

You find, in the India Pilot, many valuable fragments not inserted in later Directories, viz. Shark's Bay on the coast of New Holland; the dangerous Shoals of St. Brandon, near the French islands; Trinidad in the Atlantic, by the famous Halley, &c.

As I have, besides the fifteen country voyages in India, made four voyages from Europe thither; I hope, what I presume to say concerning the best track to keep, both going and coming,

will

will not be thought improper; although I am persuaded there are many more valuable hints than any I can give, locked up in journals \* of the skilful commanders in the East-India service, which not being collated together, nor properly digested and published, the world is so far kept from much valuable knowledge on this subject.

Thornton, in the East-India Pilot, says, you should, in crof-

\* From Mr. Dalrymple's assiduity in collating different journals, much good is to be expected.

sing the Line, or rather in going from the North Atlantic to the south, keep within certain limits; which he draws in the chart. I apprehend this is being too precise, and may be of loss to an inexperienced navigator, who may think he does right, whilst within certain rules, though baffled with calms, and unwholesome rains. Thornton says very judiciously, “ The north-east and south-east trade-winds are subject to alteration; which variableness is sometimes found a degree or two sooner than

the

“ the aforesaid latitudes.” (He might have said, three or four degrees, instead of one or two.)

“ On the coast of Brazil, the winds often blow easterly from September to March, and to the northward of east; and from March to September, it bloweth often between the east, south-east, and south-south-east.” This perfectly agrees with the parallel I propose to draw between the theory of the monsoons in India, and in the Atlantic; for, in the Atlantic, monsoons prevail, though little adverted

[ xix ]

adverted to, as shall be shewn in  
the following chapter.

A T R E A-

[ xix ]

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T R E A T I S E  
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C H A P T E R I.

O F T H E M O N S O O N S I N G E N E R A L .

THE word *monsoon* comes from the Malay word *mooffin*, which signifies season. By many who know little of the Malay tongue, the

B word

word *mooffin* is understood to mean *year*. But this is a mistake; for the word *town*, exactly as we pronounce it, signifies *year* (*mooffin season*); and in the Malay idiom they say, *mooffin baarat*, (*west monsoon*,) and *mooffin timore*, (*east monsoon*,) in places where the different monsoons blow nearly in these directions, as at Batavia, Bencoolen, Malacca, and many other places. They also say at Passir, Sooloo, Balambangan, and many other places, where the gite or situation of the land or island favours the expression, by causing the winds to blow accordingly, *mooffin attara*, (*north monsoon*); *mooffin salatin*,

tin, (south monsoon). I beg leave to call, in the course of these remarks, the well-known south-west monsoon, the *summer monsoon*; and the well-known south-east monsoon the *winter monsoon*. I also beg leave to call the north-west monsoon (well known, but the advantage to be drawn from it little adverted to in India, and of which I shall have a great deal to say in the sequel); I say, I beg leave to call it the *middle* or *cross monsoon*. It prevails from the Line to ten deg. south latitude; whilst the north-east monsoon blows to the northward of it, in the North Indian sea, in the Bay of Bengal, and in the China

seas. It is particularly mentioned by Thornton; and extends from the islands Seychells, or Maka, as far east as the coast of New Guinea, and, I believe, through Torres's Streights between New Guinea and New Holland, into the South Sea.

CHAP.

## C H A P. II.

OF THE CAUSES OF THE MONSOONS IN  
INDIA; THEIR ANALOGY TO WHAT WE  
FIND IN THE ATLANTIC; AND HOW  
THEY COINCIDE WITH, OR OPPOSE THE  
TRADE WINDS.

THAT the diurnal motion of the sun from east to west is the cause of the trade winds all over the world, with certain exceptions, owing to the intervention of lands, mountains, &c. is a kind of self-

B 3 evident

evident proposition. These winds go their continual round ; nothing interrupts in the Atlantic and Pacific oceans ; and in the Indian ocean, was the sea as open in north as in south latitude, (I mean within the Tropics,) the trade - wind would doubtless be found to prevail there also from the north-east all the year round, without any revolution from the south-west, or, in other words, there would be no monsoons.

In the Pacific and Atlantic oceans, but more particularly in the latter, the motion of the sun from north to south has certainly an effect upon the north-east and south-east trade-winds :

winds: but the Indian ocean, by which I mean the whole contained between the Cape of Good Hope, to the north-east; then east as far as the China seas; and then south, by New Holland, has no exit northward; and is open only by the Philippines and Moluccas into the South Sea.

This ocean being in a manner shut up to the north, is most obviously the cause of the return of the clouds and vapours that are drove thither in the summer monsoon; these vapours following, or being generated by the sun's approach. So islands, in hot countries, gather clouds on their hills towards noon,

when the influence of the sun is great, which are again discharged, or sent back towards the sea, when the sun is gone \*.

Let us suppose that the continent of Europe extended from Portugal west to America; or, in other words, was the Atlantic shut up to the north, that ocean would be subject to a regular monsoon as the Indian sea is: and we mean to shew it is not entirely without something which resembles a periodical mon-

\* And such hills are generally clearly to be seen early of a morning, the clouds being then subsided.

soon,

soon, situate as it is, open, for aught we know, to the North Pole.

The east promontory of South America, situated in a low latitude, projects a good way into the Atlantic. Here the currents set northward in the summer monsoon, and southward in the winter monsoon \*, following the sun precisely as they do in East India.

The body of water drove westward by the trade-wind at north-east in the North Atlantic, to the West

\* Vide Anson's Voyage, and Cook's voyage in 1775. In the Centurion, they had a continued help to the southward in winter, along the Brazil coast. This coincides with Thornton in the India Pilot, already quoted.

Indies, is stopped by the American continent, and finds an exit in the gulphs of Florida. This strong current is well known; possibly the body of water drove by the south-east trade-wind in the South Atlantic, contributes its share: But, from the gite of the east promontory of Brazil, and the trending of the coast thence to the west of south towards Cape Horn, there is the greatest reason to think the current sets southward almost perpetually, and especially as the current on the opposite African shore sets continually north near the land, from the Cape of Good Hope northward.

Of

Of the three great promontories in the southern hemisphere; Van Diemen's in New Holland, Cape of Good Hope in Africa, and Cape Horn of America, that seem by their bleak, torn, and rocky fronts to have withstood the southern storms, (whilst, possibly, many thousands years ago, low and habitable lands contiguous to them, have been submerged by the tempest,) there are two remarkable phenomenon peculiar to the African and American capes, and of which there is not the least doubt, as both are verified by experience: the current sets almost continually to the eastward off Cape

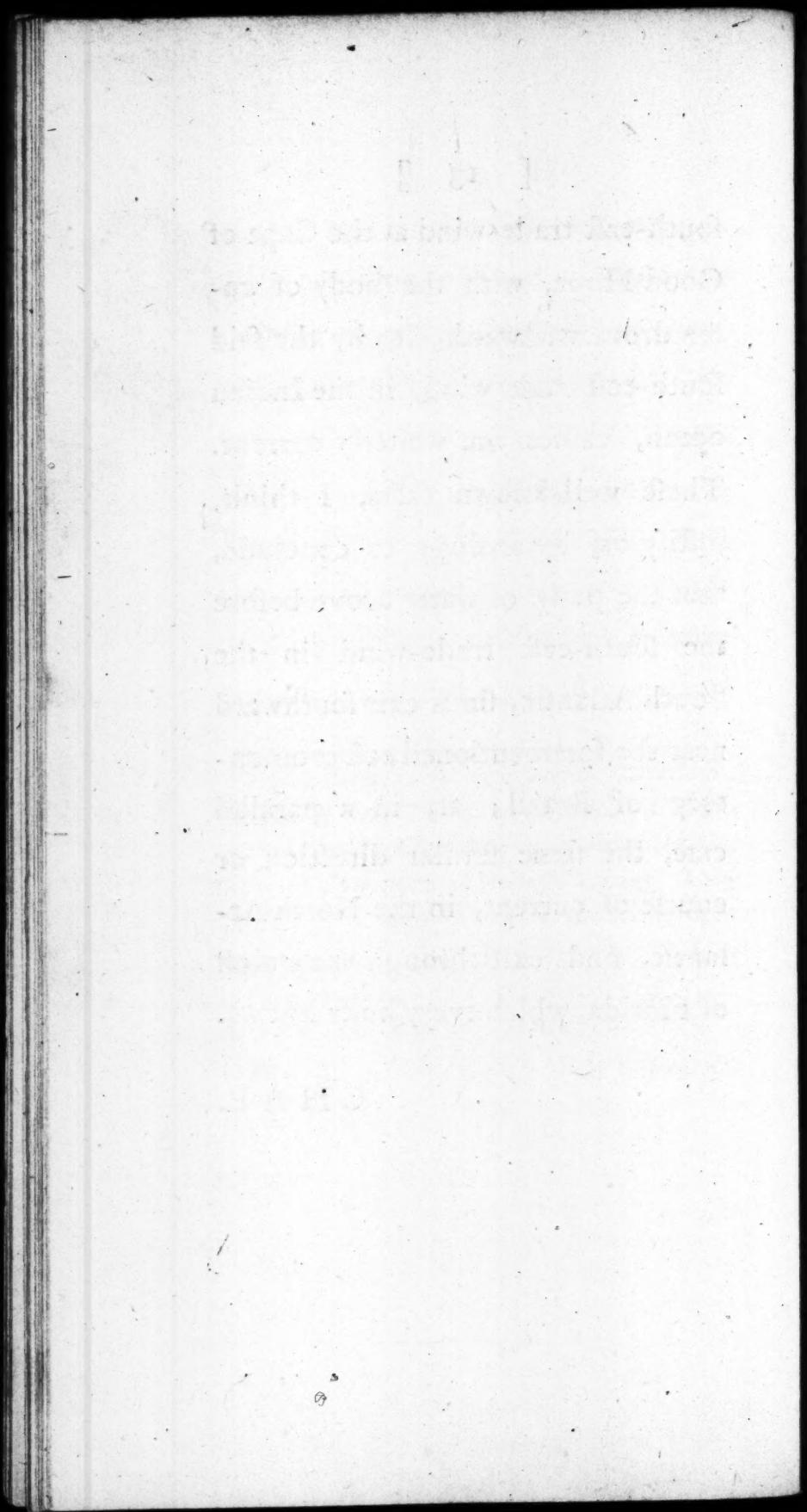
Horn, and to the westward off the Cape of Good Hope. How the current generally sets off the south promontory of New Holland, we cannot tell, having no experience; therefore I say nothing about it. But I think it is reasonable, that the almost perpetual westerly winds off Cape Horn causes the easterly current\*; and the almost perpetual

\* Vide Anson's Voyage, and the remarkable current on board the Lion of Cadiz, Captain Durloz Guyot, of St. Maloe's, published in Mr. Dalrymple's accounts of Halley's Voyage. They were set 10 d. 36 m. of long. to the eastward, in returning round Cape Horn from the Line, in 1756, and fell in with a large island in lat. 54° 50' south, and long. 41° 32' west of Paris.

south-

south-east trade-wind at the Cape of Good Hope, with the body of water drove westwards, it, by the said south-east trade-wind, in the Indian ocean, causes the westerly current. These well-known facts, I think, justify us, by analogy to conclude, that the body of water drove before the south-east trade-wind in the South Atlantic, finds exit southward near the forementioned east promontory of Brazil; as, in a parallel case, the same similar direction or course of current, in the North Atlantic, finds exit through the gulph of Florida, which every body knows.

C H A P.



## C H A P. III.

### OF THE MIDDLE CROSS WINTER MONSOON.

WE have already ascribed the cause of the north-east monsoon to a kind of revolution in the atmosphere, from where the mountains of China and Tartary, of Tibet, of Pegu, Indostan, &c. being overcharged with vapours by the approach of the sun in summer, now, at his withdrawing south in winter, discharge

discharge the accumulated load, sometimes from a north, sometimes from a north-east direction, according to the gite or lying of the coasts near which it blows. On the south part of Sumatra it blows at north-west.

The great body of water that begins to run in various directions, west, south, south-south-east, &c. according to the said gite of lands and islands, comes like a torrent between China and the Philippines, from the north-west part of the South Sea: for here only the Indian ocean is open to the north, as has been said.

The

The current that, in November especially, sweeps round Ceylon to the west, cannot arise from any great accumulation of water in the Bay of Bengal, as it is what the French call a *cul de sac*, but is furnished from the Strait of Malacca; which current I have experienced to set strong north-west and north - north - west, near Queda and Junk-Ceylon, for a little way into the Bay of Bengal, in November, from the said Strait.

Here it is obvious the said current, in the Malacca Strait, comes from the China seas; which also at this time sets through the Banka Strait towards the Sunda Islands. It is  
obvious,

obvious, also, that no great accumulation of waters can be gathered in the North Indian ocean near Surat and Malabar, as there is no exit that way northward, it being also a *cul de sac*; which brings me near Africa, where, from analogy, strengthened by experience, I suspect the middle or cross monsoon to be generated.

The south-west monsoon, sweeping down the gut of Madagascar in summer, without doubt, causes a great accumulation of vapour on the mountains of Africa. These mountains, near the cataracts of the Nile,

Nile, collect the annual stock which fertilizes Egypt.

Was Africa \* narrow from east to west, to what it is ;—was the Mediterranean and the continent of Europe much less in length to what they are ; these vapours so accumulated, might find exit to the west or north - west, into the Atlantic in winter, when the sun goes south : but, it would seem, that the burning sands of Africa drank up what part goes west from the above-mentioned mountains. The greater proportion, I suspect, goes eastward,

\* Africa is above twenty times the area of the Indostan peninsula.

on

on the Indian side, and causes the middle monsoon in winter.

From this quantity of accumulated \* vapour on Africa, I deduce the origin of the middle monsoon : True, it blows up the gut of Madagascar, as far as 20 deg. south latitude at north-east. The gite of the coast makes it follow this direction ; but, further east, a few degrees from the line to ten degrees south,

\* For land winds (to which I have already compared the winter monsoons) blow in all directions from where the vapours are most dense ; and on Sumatra, the land winds discharge themselves from the mountains that lie longitudinally in general, part to the strait of Malacca, and part to the south-west coast of the island.

it

it blows west and north-west, as by many years experience I have found, insomuch as to be induced to shape my course accordingly, and profit therefrom; and never was disappointed in getting to my port with as much dispatch as I could expect. I therefore think it is reasonable, from the said experience, to conclude, that the middle monsoon originates from the revolution of vapours accumulated in the east part of Africa, and that part of Arabia that lies between the Red Sea and Persian gulphs in summer.

Having thus given my idea of its origin, the advantages to be deduced  
from

from it are obvious: for if the navigator runs into the middle of its region, from four to eight degrees south, he may make what easting he pleases. And here I chuse to mention the currents found in the Lively brig, in 1781, in passing the region of the middle monsoon, and, immediately after, the region of the north-east monsoons. The currents set in opposite directions; as witness the following instance in the Lively.

From February the second, lat. 8 south; long. per account 74 : 9; per timekeeper 74 : 3, until February the seventeenth, (fifteen days) lat. 1 : 16 north; long. per account

88 : 24; per timekeeper 91 : 30—  
set 3 : 6 eastward of account. Winds  
mostly west-north-west.

From February the seventeenth,  
lat. 1 : 16 north, until the twenty-  
sixth, (nine days) lat. 7 : 20 north;  
long. in 81 : 18 per account; per  
timekeeper 81 : 42. Set 2 : 3 to  
the westward of account. Winds  
mostly north-north-east \*.

The Elizabeth man of war left  
Diego Rais the first of December,  
1761, bound to Madras. She stood

\* Those who go the inner passage late in  
September, should not quit the region of the  
middle monsoon, until they are as far east as  
they wish.

into

into twenty-seven degrees, south latitude, which surely was unnecessary. She got to Madras the twenty-sixth of January. In 1781, the Lively got from near Diego Rais to Anjengo in thirty-four days.

C H A P. IV.

OF THE CROSS SUMMER MONSOON.

IN the preceding chapter, on the middle cross winter monsoon, I have introduced terms, which I see in no book whatever on the subject. If I find, or pretend to find, a new road, I surely may be allowed to give that road a name. Without exact names or definitions, in a treatise on such a subject, it cannot be handled with perspicuity. I

C shall

shall therefore proceed to describe what I mean, in as plain language as possible.

The north-west wind which blows from the Line to eight or ten degrees south latitude in winter, blowing in a direction across the north-east monsoon, I have therefore called it the cross monsoon; it being bounded to the south by the south-east trade-wind, makes me call it also the middle monsoon; it lying, as it were, inclosed between the north-east monsoon to the northward, and the south-east trade-wind to the southward.

But

But the south-east trade in summer, produced, or continued from where it blows perpetually, into a region to which it has not access in winter, and so blowing in a direction that crosses the south-west monsoon, it may, with equal propriety as the other, be called a cross monsoon. This being allowed, the one may be called the cross middle winter monsoon; the other may be called the cross summer monsoon; the word *middle* not belonging to this last with propriety, as it is not inclosed on each side; or, in other words, it may be said, that, in winter, north-east, north-west, and south-

east winds blow in their respective regions; and, in summer, the south-west and south-east only. In winter three different winds blow; in summer, only two.

## C H A P. V.

OF THE MOST ELIGIBLE TRACK TO  
KEEP FROM EUROPE TO EAST  
INDIA.

IF, therefore, a ship bound from Europe to India in winter, *i. e.* from the autumnal to the vernal Equinox, keeps a good offing, and does not come near Madeira, she will have the advantage of not being so much in the region of calms, as if she keeps further east; and will also be favoured with a current setting southward.

C 3

There

There are also other reasons why I would advise a ship bound to India to keep well to the westward, even at all times.

It is obvious, that leaving the Channel with a north-east wind, and having got so far south as abreast of the coast of Portugal, if the ship do not keep well to the westward, the high Pyrenean mountains, and others on the west quarter of the continent of Europe, may, in all likelihood, check a wind, which a hundred leagues further off, blows in force\*.

\* So ships bound from the low latitudes of America to cross the Pacific to India, are often

Being

Being further advanced, abreast the great continent of Africa, if the navigator does not keep well to the westward, the retardment he will meet with may be more considerable: for the continent of Africa being very broad, its middle part full of sandy deserts, may retard or stop the general easterly wind in a very considerable degree. The Pyrenean mountains can only check, but the deserts of Africa may extinguish the said wind. And it is remarkable, baffled for weeks together, and even at a good distance from the land; which certainly is owing to the interruption the mountains left behind give to the wind. Farther on, fairly in the South Sea, this seldom or never happens.

that the region of calms, rains, and tornadoes, in the Atlantic, is opposite to the broadest part of Africa, being nearly in the same latitude: And this is not to be wondered at, when we consider that Africa is the broadest piece of land upon the globe that passes under the Equator. No wonder, then, if the wind that blows from the Indian side, is cooled, and almost extinguished, in passing over that vast heated peninsula.

And although, in the summer monsoon, the winds off the east promontory of Brazil, may be south-south-east to south, and south-south-west;

west; yet, from an apprehension that such are foul winds to get on with into a high south latitude, I would by no means have the navigator be against stretching that way, as he will thereby escape the calms that prevail further east near Africa; and, should the wind come so far to the westward as south-south-west, a good stretch may be made south-east, to where, more in the middle of the South Atlantic, the south-east trade may be expected. At the same time, I would not advise to make so free with the coast of Brazil, during the summer monsoon, as during its opposite; for, then,

the current off the east promontory of Brazil assuredly sets to the southward; but, I suspect, it sets so all the year round, for reasons given in Chap. II.

Having got into the South Atlantic, I would have the navigator pay more regard to getting south than east; that is, to steer rather south-south-east than south-east, supposing the wind enables him to do either. I know, to this advice, it will be objected, Why not steer south-east, rather than south-south-east, it cuts off so much distance? I see the force of this objection; but, let the navigator reflect, that this

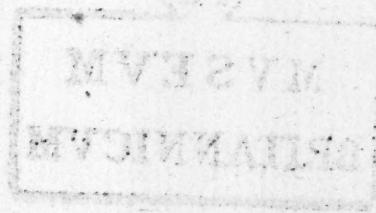
this fair wind, on which there can be no dependance for continuing; in steering south-east, and by which, it would seem, he coveted easting as well as southing at the same time, may leave him in the lurch, by the expiration of the favourable spirt, in a parallel far short of where he might have got, had the getting southing at this time been his principal object, letting the easting come in only as a collateral or secondary consideration.

Having got well to the southward, I would by no means advise coming near the Cape of Good Hope, if the navigator intends going

ing without Madagascar, but to keep in thirty-nine or forty degrees of latitude. The variation of the compass determines the longitude nearly; and it is not unadviseable to make Gough's island, whence, who knows but refreshments may be had? In this high parallel the winds are more steady, and the currents setting west near Africa are avoided.

If bound without Madagascar, I would now advise the navigator to pay his chief regard to getting eastward, and not covet northing too soon; never keep his ship right before the wind, (unless, indeed, she

sails,



sails best that way); to remember that east-south-east and east-north-east courses, combined, differ not from east. And here I would have him study the case of the ship, and her masts, in the course he shapes; always giving his officers a latitude of altering the course two or three points, so far as so doing makes the ship easier, or enables her to go faster; and by no means to confine his course to a certain point, as if deviating therefrom could be of any bad consequence here in the wide ocean.

From the longitude of ten degrees east to beyond the meridian  
of



of the island of Madagascar, the wind will frequently veer from west to south-west, south, south-south-east, and south-east, and in the course of forty-eight hours, or three days, comes round to the western quarter again. When this happens, let him keep his sails rap full, and rely chiefly on his variation for making Ceylon, or the Strait of Sunda. But, during the middle, or north-east monsoon, if bound for the Strait of Sunda, let him fall-in with Engan's, or the coast of Sumatra, south of Bencoolen. If during the south-west monsoon, but especially in May, June, and July, he is

is bound for the Strait of Sunda, let him fall-in with the coast of Java, as south-east winds prevail there in general, during these months; at the same time attended with revolutions from the opposite quarter; remembering, that the current generated by the wind at north-west, on the north end of Sumatra, in summer, though it \* drains in-shore along the

\* This circumstance of the draining of a current against the expected south-east wind, makes it not so hazardous to fall-in, in summer, to the west of the Strait of Sunda; though the Surat Dutch ship has often been baffled there. But if, during the middle or winter monsoon, he makes the land east of the Strait of

the south part of that island, the draining eastward goes not beyond the Strait of Sunda, to the coast of Java; it being already exhausted on the coast of Sumatra.

of Sunda, he must run back into the south-east trade to get westing, unless he boldly keeps near the coast of Java for land and sea winds; for here the current sets strong east during the middle monsoon.

C H A P.

## C H A P. VI.

### OF THE MONSOONS ON THE SOUTH- WEST COAST OF THE ISLAND SU- MATRA.

THE island Sumatra being bisected by the Line, causes a singular phenomenon, which ought duly to be attended to by those who have occasion to sail that way. The many voyages I have made upon that coast, enables me to say something

thing that may be depended on; and, I must acknowledge, that I failed upon it several years before I knew the theory or nature of the monsoons there. I attributed circumstances to the whole coast of winds and weather, which only belong to half the coast at a time. Experience convinced me I reasoned wrong; and I have since found, that whilst the north half of the coast from Acheen Head to the Equator, is in the region of the north-east monsoon, the other south half, from the Line to the Strait of Sunda, is in the region of the middle monsoon, (mentioned in Chap. III.) which,

which, as has been said, blows only during the winter or north-east monsoon, from the Line to ten degrees south latitude.

The south-west coast of the north part of the island Sumatra, during the north-east monsoon, is affected by it, exactly as the Malabar coast is affected during the said monsoon; that is to say, they have then the finest of weather, with land and sea breezes: For, the north-east monsoon that blows in full force behind this half of the island in the Strait of Malacca, is checked almost entirely by the high mountains; insomuch, that it does not gather force

again,

again, till at a great distance. South of the Line, the middle monsoon checks it entirely, and in a manner extinguishes it.

Fix the point of a compass half way between Acheen Head and one degree north latitude on this part of the island Sumatra, and, with it, describe a semicircle to the south-west; within this semicircle is the region of calms during the north-east monsoon: Therefore, if the navigator values his time, let him keep clear of it. If near it, and west of the meridian of Acheen Head at the same time, he will find a drain of a current setting to the westward,

westward, that comes from the Strait of Malacca.

During the summer monsoon, the south-west winds that blow in the Bay of Bengal, meeting here the high mountains, are checked, and blow down this coast from the north-west. They bring rain and bad weather as far as the Line; where, for a small space, variable winds prevail at all times of the year. Thus the gite, or situation of the coast from north-west to south-east changes the line of the wind's primitive direction; a current setting to leeward accompanies it, being part of that great body

of

of water that comes during this monsoon, from the Strait of Madagascar near past Ceylon, into the Strait of Malacca; for, at Acheen Head, it separates; part going into the Strait, and part down the coast of Sumatra.

I have already said, that this coast of the north part of the island Sumatra, resembles the coast of Malabar in the winter north-east monsoon: but there is one circumstance in which it is essentially different, and of which the navigator should take particular notice: The north-east monsoon, in the China seas, is checked by the peninsula of Malacca,

lacca, but recovers itself in the Bay of Bengal. It is again checked by the mountains of Indostan, but recovers itself in the northern Indian ocean off the coast of Malabar, where, it being lastly checked by Africa, it blows far up the gut of Madagascar\*. But the said monsoon being checked by the mountains on the north part of Sumatra, it recovers itself but faintly; being lost, as I apprehend, in the middle monsoon, near the region of which it

\* The north-east monsoon left the Elizabeth man of war in 21 south latitude and 2: 11 longitude from Mosambique, on the thirty-first of January, 1764, as has been before hinted.

comes;

comes; and this, no doubt, causes the calms within the semicircle before mentioned.

On the other hand, calms need not be expected within the above-mentioned semicircle, during the south-west monsoon. Fresh gales prevail there; and, if a ship is bound from Indostan to Batavia, let her fasten as soon as she can on the coast of Sumatra in south latitude, but not north of Indrapore Point, where, with land and sea breezes, she may get to the Strait of Sunda, against the south-east winds, that prevail on this part of the coast during the south-west monsoon,

soon, and about which I shall now speak more particularly.

Whilst the north part of the coast enjoys fine weather during the north-east monsoon, the south part of the coast is in the region of the middle or north-west monsoon, with fresh gales and rain, *vice versa* in summer; that is, during the south-west monsoon, on the south part, the wind coincides with the general south-east trade, and brings fair weather.

At this time, Dutch ships from Surat that go to Batavia, after quickly getting down the coast of Malabar, round Ceylon, are, when

D                    they

they come near the south part of Sumatra, much retarded with south-east winds. I have known these ships often put back from near the Strait of Sunda to Bencoolen, with a sickly crew;—sail thence, and put back again; making a passage of three or four months from Surat to Batavia\*. And this makes me

\* Was the ship to fasten on the coast of Sumatra, near Indrapore Point, or south of it, the current generated by the north-west wind on the north part of the island, as already hinted at, drains down the south-east part of the island, close in-shore, even against the south-west wind, of which advantage is to be made. But large ships are afraid of keeping near the land. The current, all the year round, sets the whole length of the coast, more to the southward than northward.

wonder

wonder that the annual Surat Dutch ship does not leave Surat in the month of January or February; run into six or seven degrees of south latitude; where, with the middle monsoon at west and north-west, she could quickly get to the Strait of Sunda.



## C H A P. VII.

OF THE PROPER TRACK TO KEEP IN GOING FROM MADRAS, OR BENGAL, TO BENCOOLEN, BATAVIA, OR PARTS FURTHER EAST, DURING THE WINTER NORTH-EAST MONSOON.

I HAVE been going from Madras to Bencoolen during the north-east monsoon, and, by steering south-east the nearest track, have had a tedious passage. About the meridan of Acheen, and a de-

D 3 gree

gree to its southward, had the wind at south-east blowing fresh for several days. This was certainly a very irregular wind at this season. I was also once going a freighter in the Europe ship Denham, from Bengal to Bencoolen, the latter end of winter (February), and by not keeping the Bay open, but coasting Sumatra, without the islands Virkins, Nantian, Nays, Fortune, and the Nassau islands, we had a tedious passage to Bencoolen, as we went within that semicircle, recommended in a former chapter to be avoided.

The

The best track is to keep the Bay open; or, in other words, keep near the meridian of Point Palmiras, steering south, until in five or six degrees south latitude, where the middle monsoon at west and north-west may be expected. This coincides with the track kept by ships going to China, by Captain Wilson's (Pitto Strait) passage.

The same track is recommended, if bound from Bengal to places eastward to south latitude: but, if bound to Acheen, or the north part of Sumatra, let the navigator keep well to the windward of Acheen Head, and go through the Surat

D 4. passage,

[ 56 ]

passage, if bound to Nalabow, or elsewhere down the coast of Sumatra.

CHAP.

## C H A P. VIII.

OF THE TRACK TO KEEP FROM MADRAS, OR BENGAL, TO BENCOOLEN,  
DURING THE SOUTH-WEST MONSOON..

**I**N the month of August, a ship may get from Bengal to the southward, by keeping close to the coast of Coromandel; for then the freshes of the Ganges set along-shore. Having got a little way down, as far, perhaps, as Point Gode-

D 5 war,

war, she may put of, when the wind hangs well to the westward, and get southing and easting together. But, should the navigator fall to leeward of Acheen Head, (for in Acheen road the wind blows through the Surat passage at south-west into the Strait of Malacca) let him anchor, the nearer the shore the better; and, by land and sea breezes, he may easily get to Acheen road, where, in smooth water, he may anchor and refresh.

Departing from Acheen, the track is down the coast of Sumatra, leaving what is called Passage Island, on the right hand; off the north-west

west end of which is a reef, which it would be proper to send a boat to reconnoitre, and lie upon, until the ship is past. Thence steer for Pulo Mazular, on the north-west end of which is a remarkable water-fall. In the French and English maps of this part of the coast, both copied from the Dutch (I believe), a line or track is drawn, and depth of water is signified close by that line. The ship Experiment was lost on Bird Island, two miles north of Pulo Lucotta, in 1772, by keeping in twenty-eight or thirty fathom water. I have been on this very small island three or four times, in

D 6. passing

passing this way, to get birds and eggs: it is not in magnitude above half an acre, with grass upon it. Off its north end, is a reef extending near a mile, where the ship was lost, owing, chiefly, to the false soundings laid down in the chart: therefore, I request the reader will take particular notice of what I am going to say on that subject.

I have passed this island at least ten or twelve times, and have been on it three or four times. In 1756 there was no grass upon it. In 1765, there was grass on it. I have passed it in the night, without seeing it, steering by soundings, in seventeen

teen and eighteen fathoms muddy ground; also in the day, and almost (as near as, I can recollect) in that mid-channel line laid down in the printed charts, and where seventeen, eighteen, and not above twenty fathoms, should have been wrote; instead of which, thirty and thirty-two being wrote, the navigator naturally thinks, whilst in that depth, he is in that line. But I assert, that such a depth will carry him (if not upon) very near the island; which, though bold to the north within pistol-shot, is foul to the west. It is pity but the copper-plate was altered, by crazing from

the

the track thirty and thirty-two, and engraving thereon seventeen or eighteen fathoms, for at least four or five miles.

Besides the reef of this Bird Island, there are some very dangerous spots of coral rocks, under water, to the eastward of it, which I have seen as I passed. In short, sailing from Passage Island, until past Mazular, I would advise not to sail in the night; except, within and near Mazular, I always passed within it. Having passed Mazular, steer for Pulo Battoo, by the Malays called Pingee; off the north end of which are three islands:

give

give them a reasonable birth, and steer on, within the large islands, but without the small islands.

If, further down the coast, near Indrapore Point, you meet south-east winds, the ship must anchor, and, with land and sea breezes, work down the coast, observing what is said in the Directory about the shoals off Ipos, and other places north of Bencoolen.

Hitherto, I have supposed the ship to pass within Pulo Virkins, and what is called Pulo Banjack, or Pulo Bania. Pulo Bania (many islands) is the proper name. On the largest of this last cluster, which lies

lies south-east of Virkins, is a remarkable hill, making, in some directions, like a sugar-loaf. If you go by Passage Island, this hill must be left on the right hand; but there is passage without it, *i. e.* between it and Pulo Nays. Keep nearest Pulo Bania, and anchor in the night; for there are some shoals, and small islands, no where laid down; therefore pass them by day-light.

Further, by avoiding both these straits, you may keep at sea, and pass between Nays and Nantian, where is a bold passage; or even as far as Nassau, or the Poggy islands, where, sailing close to the north,

Nassau

Nassau island, is a good passage, leaving it on the right; but, so far to the southward during the south-west monsoon, south-east winds may be met with: therefore you must get in-shore, and anchor close to the main land, and trust to land and sea breezes, as before directed, being now absolutely in the region of the south-east monsoon; observing, if you have rain on the springs, it generally brings the wind from the westward, as south-east winds bring fair weather.

right hand. It is a kind

## C H A P. IX.

OF THE BEST TRACK TO KEEP FROM  
INDOSTAN TO CELEBES, OR, THE  
MOLUCCAS, DURING THE SOUTH-  
WEST MONSOON.

**S**AILING from Indostan so far east, and in south latitude, it is obvious that the navigator will meet the wind at south-east east of the meridian of the Strait of Sunda, and even before. He is sure of it in May, June, and July; but there are

are often spirits of westerly wind, from which he may profit. The best rule, I think, is to get with the westerly winds in north latitude, as far east as he can; then, when the wind comes south-east stand south. Near about the Tropic he may find the wind south, south by east, nay south by west, with which he may put about, fetching well to windward, according to where he is bound: If bound to Gilolo, he must stand far south, and make New Holland; on the west coast of which, I suspect, the wind is in this monsoon at south, corresponding to what it is on the opposite side of India,

India, on the coast of Africa. But, assuredly, when he comes to that part of the coast of New Holland where the land trends suddenly eastward, in summer, he will have the wind at east.

If bound to the north coast of Celebes, the ship may go the usual track between Balambangan and Borneo; then, having worked down the north-east coast of Borneo, according to instructions printed in a *Voyage to New Guinea*, she may fetch the north coast of Celebes; remembering that, in this monsoon, the wind is fresh at south up the channel between Borneo and Celebes.

C H A P.

200  
dust. As the *U. S. Fish Commission* no. 1515  
was not enough to satisfy all the  
hundreds of species that have  
been described it has been  
decided to add to the present

Specimens

in the collection of the Bureau of  
Fisheries, and to add to the  
present collection of the Bureau of  
Museum of Natural History, New  
York, by giving to the Bureau  
of Fisheries the specimens  
of the following species of gulf  
fishes to be used  
except the newly caught or collected  
specimens which are to be  
retained with the Bureau of  
Museum of Natural History, and  
the specimens of the following  
species

CHART

## C H A P. X.

OF SAILING FROM INDOSTAN TO  
MAGINDANO, (OR MINDANO) AT  
ALL TIMES OF THE YEAR.

**I**N the south-west monsoon, *i. e.* from May to October, a ship may get there in the usual track, through the Strait of Malacca, in about five or six weeks, passing close to the north part of Balambangan, and to the south of Basilan: she might afterwards proceed to China

China as late as October, by the east of Mindano; nay even later: until December she has China, as it were, under her lee; because she can get into the South Sea far nearer to China than the Pitt's Strait. I may venture to say, a good ship may get from Mindano to China, at any time of the year, and *vice versa*. She may also return from Mindano to Madras at any time.

If during the south-west monsoon, from May to October, she must stand over to the west coast of Celebes, where, with land and sea breezes, she gets to the southward, so as to be able to weather Pulo-

Laut

Laut on the south-east part of Borneo. Care must be taken to keep close to Celebes; because, on the opposite shore of Borneo, the winds are at south. Having passed Pulo-Laut, the wind is fair at south-east, to run within Java through the Strait of Sunda into the south-east trade, in eight or nine south latitude; and the ship ought to endeavour, before she stands to make Ceylon, to be full as far west as the meridian of the west part of it. A north course may then only make the east part of it, the current sets so strong east, when the ship comes near the mouth of the Bay of Bengal.

E I have

I have said the navigator must, from Mindano, shape his course between Celebes and Borneo. This is recommended, because the west coast of Celebes is high, and he is sure, by sea and land winds near it, to get forward. If he went between Celebes and Gilolo, possibly he could not get forward at all; as I suspect (though I cannot certainly say) that a southerly wind blows throughout these Straits, during that monsoon, from side to side; which is not the case in the other channel between Celebes and Borneo. Prows go continually from Passir to Batavia, and elsewhere,

where, by standing over to Celebes, to the northward of the Little Pater-nosters, and so weather Pulo-Laut where, in the south-west monsoon, the wind is south-east.

To sail from Mindano to New Guinea during the south-west monsoon, the navigator must sail into the South Sea, as far as the meridian of the part he wants to visit, and then steer south, endeavouring to fall-in to the eastward of his port, as the current sets west on this coast during that monsoon, and the wind is at south-east.

In short, Mindano is so centrally placed, that I see no difficulty

of sailing to and from thence at all times to any part of India, by observing this general rule: that during the south-west monsoon, from May to September, the winds in India, east of Ceylon, are south-east in south latitude; and, during the north-east monsoon, that is, from November to May, the winds are north-west in south latitude; I mean, from the line to nine or ten degrees.

This being adverted to, which is really the case, it is obvious, that a ship may get from Madras, Bengal, or Bombay, to Mindano at any time; if during the south-west monsoon,

monsoon, the course is well known to be through the Strait of Malacca, as has been said; if during the north-east monsoon, from November to May, she must run east in five or six south latitude, and might venture, having passed Salayer, in the track to Pitt's Strait, to stand north between Celebes and Gilolo; but if between these islands she finds a northerly wind, which is likely, I would rather advise to stand east directly through the strait of Augusta, Pitt, or Golowa, into the South Sea, preferring the southern Strait. Being then in the South Sea, the ship must steer north,

as if going to China, and make St. Augustine, the south-east point of Mindano.

This passage is against the monsoon, but may be made in seven or eight weeks from Madras to Mindano; whereas, with the monsoon, it may be made in five or six weeks.

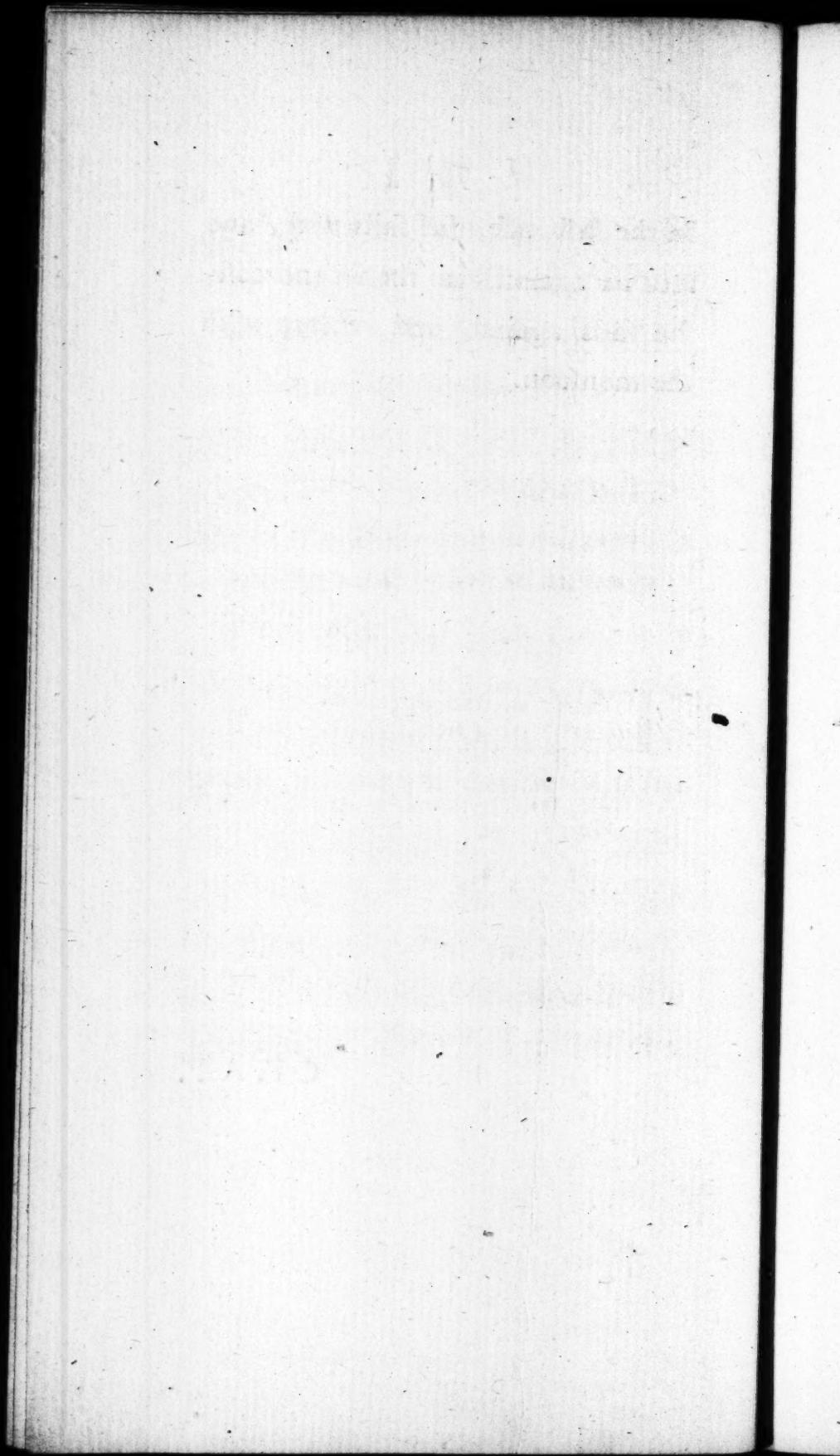
From what has been said, it is obvious, that a ship may sail from Madras to Mindano in five or six weeks, and return directly in seven or eight, during the south-west monsoon, and *vice versa*. She may sail during the north-east monsoon to Mindano in seven or eight weeks, and return to Madras in five or six:

In

[ 79 ]

In the first case, she sails with, and returns against; in the second case, she sails against, and returns with the monsoon.

E 4. CHAP.



C. H. A. P. XI.

OF THE OUTER PASSAGE TO BOMBAY ; OR  
CROSS WINDS IN THE BAY OF BENGAL ;  
CURRENTS IN THE CHINA SEAS ; SOUTH  
COAST OF AFRICA ; PASSAGE HOME.

THE advantages of getting to the eastward in winter, by running from Indostan into the cross (winter) or middle monsoon, have been sufficiently illustrated. The getting to the westward against the south-west monsoon, may also be effected by a similar manœuvre,

viz. running into the south-east trade: this is called the outer passage to Bombay and the Gulps, now well known, and first, I believe, attempted and executed by that able seaman and navigator Sir William James, in the *Prote<sup>te</sup>teur*, about the year 1756. The general rule is, to avoid the Basses de Chagos, by steering in a certain parallel. A kind of cross wind blows also in the Bay of Bengal during February, March, and April. Whilst in the middle of the Bay, it blows north-east; along the coast of Coromandel, it blows from the southward, well known by the name of the

Long

Long-shore winds; notwithstanding the wind blows often at north-east, in February on the coast of Coromandel, and sometimes in March, for a few days. Whilst the Long-shore winds blow, it is impossible to get against them to the southward without leaving the land; but when in May land-winds begin to blow, it is easy to get to the southward. At the beginning of the north-east monsoon, the current sets strong to the southward in the China Seas; and at Pyrate's Point, the north cape of Borneo, it divides, passing both the west and the north-east coast of that island, until late in

E. 6. January.

January. The current then sets west, through the strait between Borneo and the islands Balambangan and Banguey.

I shall say little about the passage home from India; it is a kind of beaten track. Many commanders in the service can treat the subject better than I: But, in getting along the south-east coast of Africa, I am an advocate for keeping near the shore, to profit from the windward current; and there the winds never blow right on the shore, which lies nearly east and west: I have therefore called that quarter the south coast of Africa. The idea of a cape,

cape, which oftener makes an acute than an obtuse angle, may have led geographers to make the famous Cape of Good Hope an acute angle; whereas, it is nearly a right angle, the coast trending almost due east a great way. Being past it, I am for avoiding Africa for the same reason as when outward bound; but ships are seldom so much becalmed homeward, as when leaving England.

C H A P.

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## C H A P. XII.

### DESCRIPTION OF THE ISLAND OF TRININADO.

PETER MATHIAS JOELE, commander of the Nord Nienco Landt, a ship of sixty-four guns, belonging to the Dutch East-India Company, put in at Trinidad in April 1760. They hove down the ship, and cut a main-mast in the woods: in fourteen days they left the island.

The

The Portugueze are in possession of the island, and, to a man, have been banished from the Brazils, a priest or two only excepted; and these are not to be trusted in any instance whatever.

When he hove his ship down, he was obliged to keep a constant guard. He got bullocks of a middling size for six dollars a head. They got poultry in great plenty, and Indian corn, but no other grain. Coarse check shirts, and coarse broad brim'd hats, answered much better than money.

## DIRECTIONS FOR THE HARBOUR.

When the rocks of Martin Vaz (which lie east by south southerly from Trinidad seven leagues) bear east-south-east and the east parts of Trinidad north-east by east; the bay begins to open, wherein, at the upper end, you will see a hill like a sugar loaf. A mile from the shore you have soundings forty-five fathoms, coarse sand. In the mouth of the bay you have thirty-five fathoms; and by the time you have got this length, or soon after, you will

will perceive three bays; one right a-head, called the northermost or middle bay; and one on either hand, called the eastermost and westermost bays. The eastermost is the best of the three; the westermost is full of rocks; and the northermost, having shoal water, is also open to the sea.

The eastermost bay is to be distinguished by a church with a large cross upon it, which stands at the upper end. You may come to anchor in six fathom water, the aforesaid church bearing west-south-west; and thus situated, you may moor your ship with a cable on shore; a point like

like the south foreland bearing south-west by west. The watering place is near the church; and you may lay your long-boat under it, and fill the casks by means of a hose.

This island lies in the direct track of India ships outward bound. They always endeavour to go to the eastward of it; but if the south-east trade-wind is not favourable, they either fall-in with it, or go to the westward of it.

I was favoured with the above account from Mr. Kidd.

C O N-



## CONCLUSION.

**H**AVING, in the preceding pages, gone through what I undertook, *A Treatise on the Monsoons in India*, I beg leave to make a few desultory remarks.

What I have said, has sprung from a long practice, on which I have formed a kind of theory. The theory goes hand-in-hand with the preceding practice; and, in many places, I frankly acknowledge my errors, particularly about the south-

south-west coast of the island Sumatra, where I have often been. Latterly, I found circumstances of wind and weather peculiar only to half the coast at a time, which I, in the days of my ignorance, attributed to the whole length of that south-west coast. I never knew a severe gale of wind on that coast. It often blows from the north-west a close-reefed topsail gale; seldom above that, unless, perhaps, where a land-wind comes off at north, it may, for a few minutes, oblige a ship to edge away with the main-sail up, which is a far preferable manœuvre, if there is room, than to

to clew up a topsail, and by letting it flap, endanger its existence. These squalls seldom last above seven or eight minutes with violence. Here the Equinoctial Line, which bisects the island, acts like a temperator, if I may be allowed to use the word. Storms are never frequent near the Line; and the changing of monsoons, on this coast, is never accompanied with that violence that we find in the Bay of Bengal, and the China seas. There the adjacent continents, with high mountains, breed tempests like what is found on the west coast of North America. Islands, it would seem,

cannot

cannot accumulate stock enough of vapour to produce violent gales; and what matter they do collect, at a certain distance, evaporates.

The severe gales we hear of at Mauritius is mostly internal, and within two or 3 leagues of its outer circuit. Further off, I suspect, the weather may be moderate, whilst irresistible hurricanes pervade the island itself. The wind loses its force inversely, as the square of the distance, that is, when the gale is generated in the island: But, in the latitude of Mauritius, gales are often felt very severe blowing from south-east and then veer with the utmost violence,

violence, much more than is ever found in north latitude, in the Indian, Atlantic, or Pacific seas, except at the critical breaking-up of the monsoons in India, or in the hurricane months in the West-Indies. The cold is also more severe in the southern than in the northern hemisphere; witness the severity of it felt at Terra del Fuego in summer, as once experienced by the Two Friends, Banks and Solander.

T H E E N D.



121

more  
found in body tissues in the in-  
guin, Abdominal, or Pelvic less, ex-  
cept in the cervical pectorine and of  
the mesogastrium in Italy or in the  
hinterneuronegs in the New-World.  
The cord is also more scarce in the  
countries than in the northern re-  
gions; while the locality of its  
nest is that of the species in number  
as once experienced by the Two  
Friends, Bute and Gouraud.

TAZEND.

